MAGNETIC PARTICLE INSPECTING CONNECTING RODS

GE 7FDL DIESEL ENGINES

EXPLANATION

These instructions are to provide an acceptable procedure for magnetic particle inspection of connecting rods and to establish limits of acceptability for indications found during inspection. The following is based on the use of a liquid suspension of fluorescent magnetic particles.

MAGNETIC PARTICLE INSPECTION

EQUIPMENT

The magnetic particle inspection equipment must be capable of meeting all the requirements of these instructions. Refer to the manufacturers' instructions for information on maintenance and operation of the inspection equipment.

PROCEDURE

Each part (MASTER AND ART ROD, MASTER ROD CAP) is inspected in a manner to detect all possible imperfections. Each inspection consists of two distinct magnetizing, inspection and demagnetizing operations so conducted that the magnetic lines of force will be approximately at right angles to any imperfections in the part. Proceed as follows:

1. Thoroughly clean all parts to be inspected as any contamination (dirt, grease, oil, etc.) would give faulty indications and discolor or contaminate the magnetic substance. Do not use rags for cleaning as lint may give false indications. Brushes are recommended. Dry parts with an air hose before placing in the magnetic particle inspection equipment.

2. Openings in the parts which lead to areas where the magnetic substance cannot be easily removed should be plugged with corks or some other suitable material before inspection begins.

3. Place the part into the inspection equipment and see that good electrical contact is made. See Figs. 1, 2 and 3 for a typical set-up.

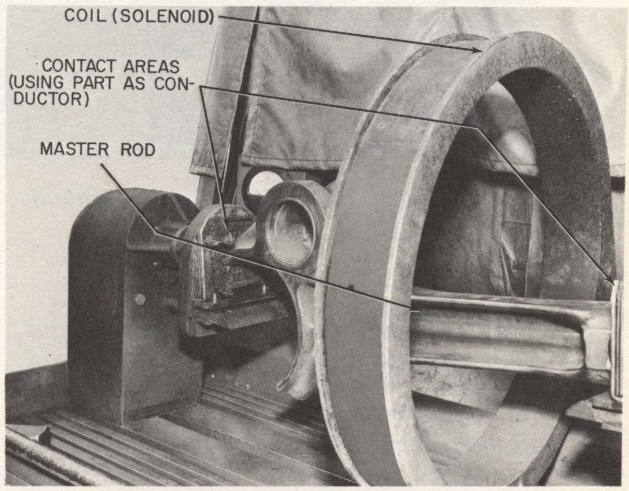

Fig. 1 (E-16139)

Fig. 1. Master rod positioning, typical

CAUTION: IF GOOD CONTACT IS NOT MADE END-ARCING WILL OCCUR AND SEVERELY DAMAGE THE PART.

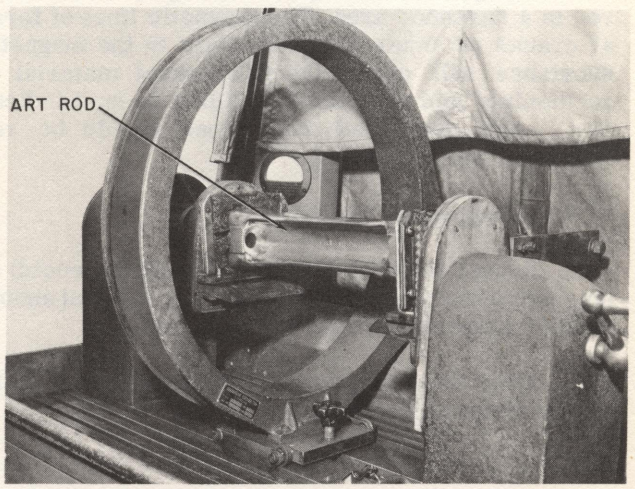

Fig. 2 (E-16140)

Fig. 2. Art rod positioning, typical

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

Verify numbers for parts, tools, or material by using the Renewal Parts or Tool Catalogs, or contact your General Electric representative for assistance. Do not order from this publication.

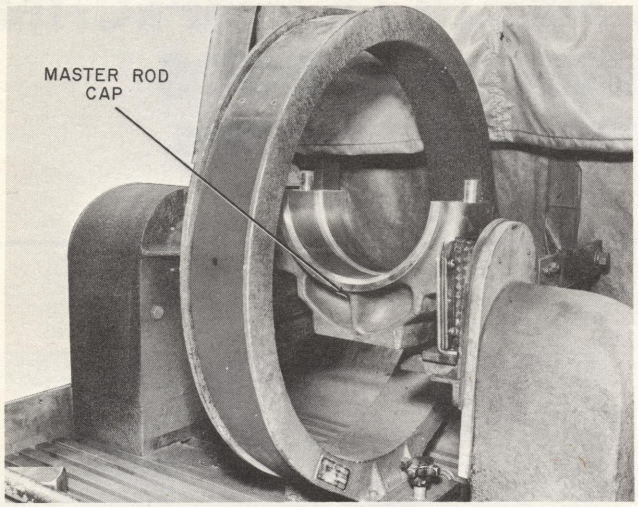

Fig. 3. Master rod cap positioning, typical

NOTE: All arc strikes must be ground out and reinspected. If necessary, part should be etched with a 20-percent solution of ammonium persulfate in water to detect all evidence of the heat affected area.

4. Apply suspension liberally to all areas of the part.

5. Apply the magnetizing current using the part as the conductor. The magnetizing current should be 3000 amperes dc.

6. Using "black" light, thoroughly inspect the rod in a darkened area. The magnetic lines of force at cracks or other discontinuities in the magnetic substance will cause the fluorescent material to accumulate and glow showing a line or spot indication. Any suspected indications should be re-examined and confirmed.

7. Demagnetize the part.

8. Repeat Steps 4-7 using the coil (solenoid) to magnetize the part. The magnetizing current should be 2000 amperes dc applied to the coil.

9. After final inspection demagnetize and thoroughly clean all parts before reuse.

INDICATION ACCEPTABILITY

1. Acceptable – Longitudinal indications within the area set by dimension "A" (in Fig. 4 ART ROD DETAILS AND Fig. 5 MASTER ROD DETAILS) which are less than 8 inches in length and do not extend into a pin bore or a bolt seating area.

2. Acceptable – Longitudinal indications within the area set by dimension "B" (in Figs. 4 and 5) which are 1/8 inch from the bolt hole centerline and do not extend into a pin bore or the 3/32 radius on the edge of the bolt seating area.

NOTE: If indication is within 1/8 inch of bolt hole centerline, then grinding may be done to a minimum wall thickness of 0.250 inch.

3. Acceptable – Indications in the 3/4 oil groove of the master rod and master rod cap which are less than 2 inches in length and do not extend into an oil hole or split face. See Fig. 6.

4. For indications not defined under Items 1, 2 and 3 (preceding) the following instructions should be used.

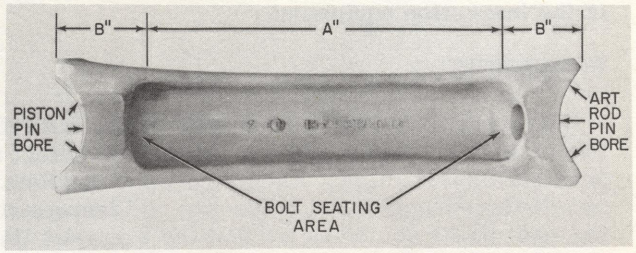

Fig. 4. Art rod details

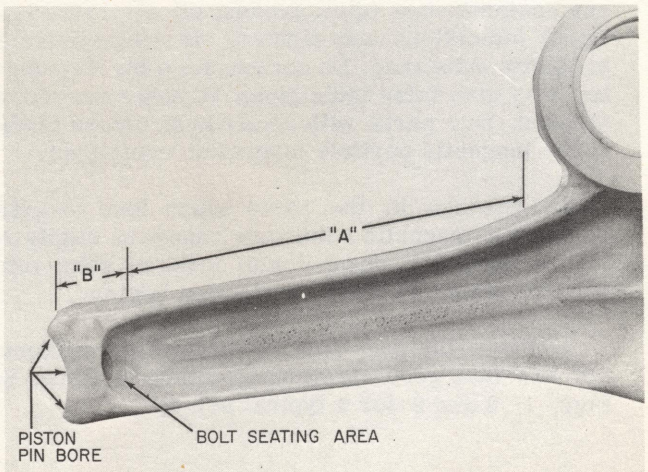

Fig. 5. Master rod details

Fig. 3 (E-16141)
Fig. 4 (E-16142)
Fig. 5 (E-16143)

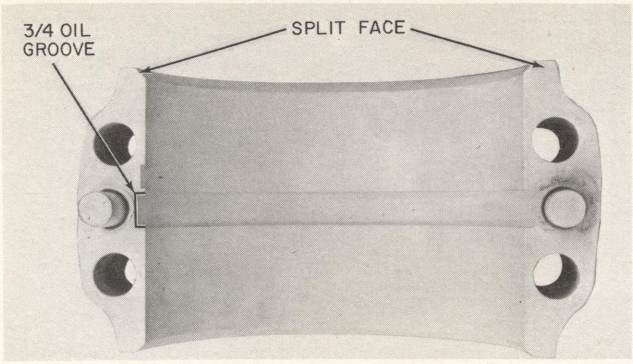

Fig. 6 (E-16144)

Fig. 6. Master rod cap details

a. If indication is on a machined surface and drawing tolerance permits, then attempt to eliminate the indication by removing more material.

b. If indication is on a forged surface, attempt to remove by grinding. Do not exceed a depth of 3/32 inch or 15 percent of the total metal thickness at the defect. The ground area must be blended to the body of the rod.

5. Any nicks or dents must be blended in as Item 4 preceding.